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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,210	11/18/2003	Timothy A. Brandsberg	7003	4830

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EXAMINER	
PATEL, ISHWARBHAI B	
ART UNIT	**PAPER NUMBER**
2841	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/716,210	BRANDSBERG ET AL.	
	Examiner	Art Unit	
	Ishwar (I. B.) Patel	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) *12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-11, drawn to a superconducting cable, classified in class 174, subclass 125.1.

   II. Claims 12, drawn to a method of making a superconducting cable, classified in class 29, subclass 599.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions group II and group I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process. The product does not need the separate steps of reducing the diameter of the conduit tubing to form a rectangular shape and compressing the rope into the rectangular shape. The product can be made by compressing the ropes and the conduit tubing together.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with D. Neil LaHaye (Reg. 30,767) on July 13, 2005 a provisional election was made with traverse to prosecute the invention of group I, a superconducting cable, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claim 12 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshihiro Wachi, Japanese Patent No. JP405217433A (Wachi).

Regarding claim 1, Wachi, in figure 1, discloses a superconducting cable comprising a plurality of individual superconducting wires (11) that are stranded into

wire bundles and ropes (12,13), wherein the individual wire bundles and the ropes are pressed together at their points of contact by a surrounding conduit (16) that has been compressed to form a nearly rectangular shape.

Regarding claim 2, Wachi further discloses each of the individual wires (11) is capable of maintaining high densities of current when combined with other of said individual wires (as each wire is made of NbTi superconducting material suitable for conducting electric current).

Regarding claim 9, Wachi further discloses each of the superconducting wires (11) comprises a multiplicity of superconducting strands in a copper matrix (page 2 of 3, paragraph 0011, of machine translation).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wachi, as applied to claim 1 above.

Regarding claim 9, Wachi discloses all the features of the claimed invention including void for coolant flow, (see abstract). Wachi does not disclose the void fraction of about 50%. However, the quantity of the coolant and respecting void for coolant path,

will depend upon the temperature of the coolant and the heat generated during the current flow to maintain the superconductivity and the void / space for flow of the coolant will be adjusted depending upon the required flow rate of the coolant to maintain the required temperature level.

Further, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the cable of Wachi with the geometry for the superconducting cable providing at least a 50 % void fraction for accommodation of a liquid coolant, in order to maintain the required temperature of the cable for its superconductive functionality.

10. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wachi, as applied to claim 1 above, and further in view of Meserve, US Patent No. 6,199,266.

Regarding claim 3, Wachi discloses all the features of the claimed invention as applied to claim 1 above, but does not disclose the individual superconducting wire is plated with material of high electrical resistance.

Meserve discloses a superconducting cable with high resistance nickel plating on conductive wire (column 2, line 33), in order to increase interstrand resistance to reduce the eddy current loss (column 2, line 33 and column 1, line 5-25).

A person of ordinary skill in the art at time of applicant's invention would have been motivated to provide the wires plated with a material of high electrical resistance in order to increase interstrand resistance to reduce eddy current loss.

Therefore, it would have been obvious to person of ordinary skill in the art at the time of applicant's invention to provide the cable of Wachi with wires plated with a material of high electrical resistance, as taught by Meserve, in order to increase interstrand resistance to reduce eddy current loss.

Regarding claim 4, the modified cable of Wachi further discloses the individual wires are plated with nickel as applied to claim 3 above.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wachi, as applied to claim 1 above, and further in view of Eriko Yoneda, Japanese Patent No. JP405198223A (Eriko).

Regarding claim 5, Wachi discloses all the features of the claimed invention as applied to claim 1 above, but does not disclose
a non-superconducting wire in each bundle of individual superconducting wires.

Eriko disclose a superconductor cable with a central (non superconducting wire) wire (5a) in order to have smaller eddy current loss and a coupling loss between strand and central wire (see abstract).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the cable of Wachi, with a central non

superconducting wire, as taught by Eriko, in order to have smaller eddy current loss and a coupling loss between strand and central wire.

12. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wachi, as applied to claim 1 above, and further in view of Snitchler et al., US Patent No. 6,038,462 (Snitchler).

Regarding claim 6, Wachi discloses all the features of the claimed invention including the bundles of wires are each a first stage cable (12) which are twisted, but does not disclose the twist pitch of about 10-15 mm.

Snitchler discloses a superconducting composite article and states in the background on the invention that current losses may be minimized by twisting the superconducting filament, (column 2, line 31-34).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to twist the superconducting wires or for that matter the superconducting ropes to minimize the loss.

Further, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the superconducting cable of Wachi with first stage cable with a twist pitch of about 10-15 mm, in order to reduce the loss, as taught by Snitchler.

Regarding claim 7, Wachi discloses all the features of the claimed invention including the ropes are ropes or bundles of the first stage cable and are twisted to form a second stage cable (13) but does not discloses a twist pitch of about 30-45 mm.

Snitchler discloses a superconducting composite article and states in the background on the invention that current losses may be minimized by twisting the superconducting filament, (column 2, line 31-34).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to twist the superconducting wires or for that matter the superconducting ropes to minimize the loss.

Further, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the superconducting cable of Wachi with second stage cable with a twist pitch of about 30-45 mm, in order to reduce the loss, as taught by Snitchler.

Regarding claim 8, Wachi discloses all the features of the claimed invention including a plurality of said ropes twisted together to form a third stage cable (15) but does not disclose the twist pitch of about 100-120 mm.

Snitchler discloses a superconducting composite article and states in the background on the invention that current losses may be minimized by twisting the superconducting filament, (column 2, line 31-34).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to twist the superconducting wires or for that matter the superconducting ropes to minimize the loss.

Further, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the superconducting cable of Wachi with third stage cable with a twist pitch of about 100-120 mm, in order to reduce the loss, as taught by Snitchler.

13. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wachi as applied to claim 1 above, and further in view of Benz, US Patent No. 4,336,420, Shimada, US Patent No. 5,200,577 and Tanaka et al., US Patent No. 4,611,390 (Tanaka).

Regarding claim 11, Wachi discloses all the features of the claimed invention as applied to claim 1 above, including the superconducting cable contains at least three stages of sub-cables, but fails to disclose the first stage includes copper-jacketed superconducting strands with a solid

copper central strand, the second stage includes a number of first stage sub-cables surrounded by stainless steel foil with a spiral gap, and the third stage includes a number of second stage sub-cables surrounded by stainless steel foil.

Benz, in figure 7 and 8, discloses stranded wire with central stabilizing wire (59,61) made of copper.

Shimada, in figure 4, disclose a stranded wire with a central wire (core material 21) as reinforcing material (column 4, line35 and 59).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the cable of Wachi, with central strand made of copper, as taught by Benz and Shimada, in order to have work as a reinforcing material and stabilizer.

Regarding the stainless steel foil, Wachi discloses an insulating tape (14) with a gap but does not discloses it is formed on stainless steel.

Tanaka, in figure 16, discloses superconducting compound stranded cable with a stainless steel tape (17) preventing deformation of cable and providing effective channel for a cooling medium (column 10, line 26-40).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide a the cable of Wachi with first stage sub-cables surrounded by stainless steel foil with a spiral gap, and the third stage includes a number of second stage sub-cables surrounded by stainless steel foil, as taught by Tanaka, in order to prevent deformation of cable.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Funaki et al., discloses a superconducting cable with first stage subcable (12), second stage subcable (13) and third stage subcable 14, stranded around non superconducting cores 18, 19 and 20 respectively.

Shimada Mamoru disclose a super conducting stranded wire (4) wrapped with insulating tape (7) made of stainless steel, see abstract.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IB Patel

Ishwar (I. B.) Patel
Examiner
Art Unit: 2841
September 6, 2005